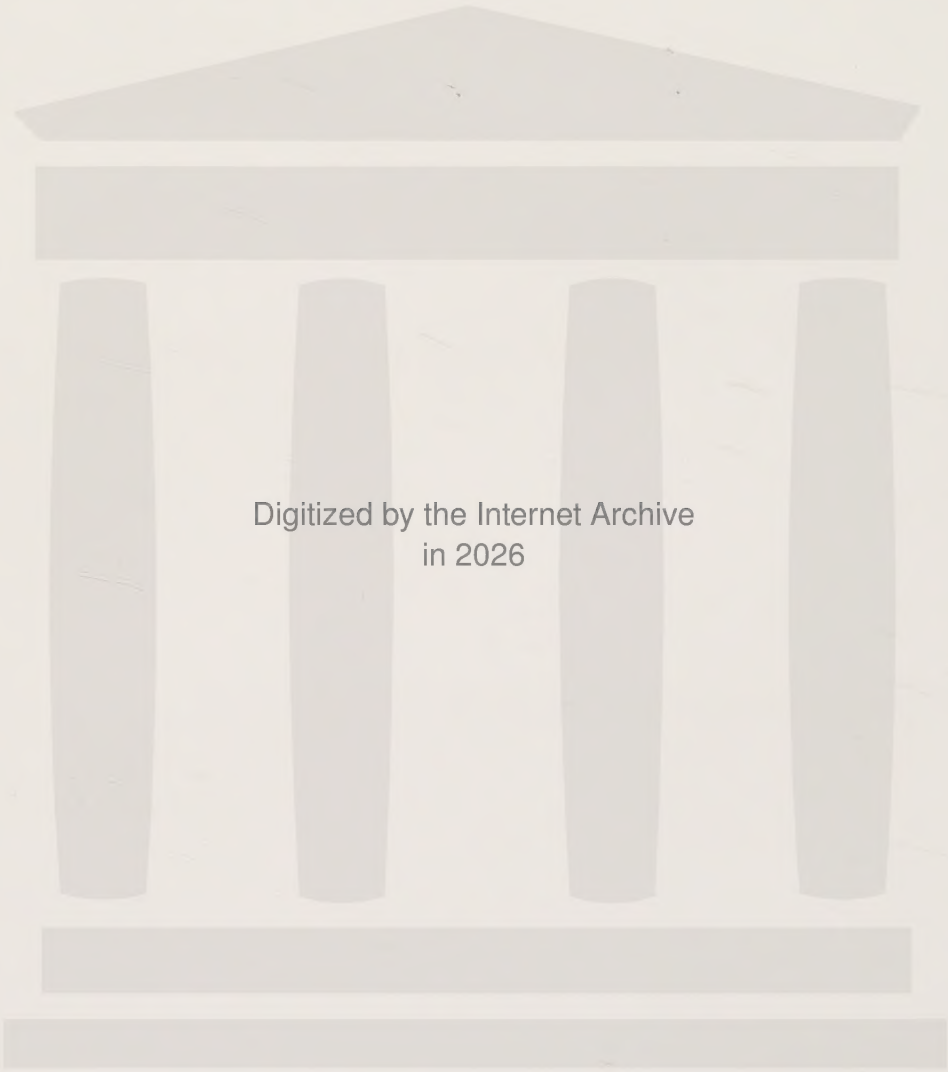
SOUTH AFRICAN COMMERCIAL FISHERIES REVIEW ~ 1996

MARINE AND COASTAL MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL
AFFAIRS AND TOURISM
SOUTH AFRICA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ISSUE 6

Aug. 24, 2001
2570 Dole Street

Republic of South Africa
Department of Environmental Affairs and Tourism
MARINE AND COASTAL MANAGEMENT

CAPE TOWN 2001

Published by
MARINE AND COASTAL MANAGEMENT
Private Bag X2, Rogge Bay, Cape Town 8012

SOUTH AFRICAN COMMERCIAL FISHERIES REVIEW 1996

ISSUE 6

Editor: C.S. Attwood
Artwork: A.P. van Dalsen
Design & Typesetting: Günther Komnick Design Studio

Printed by: Creda Communications

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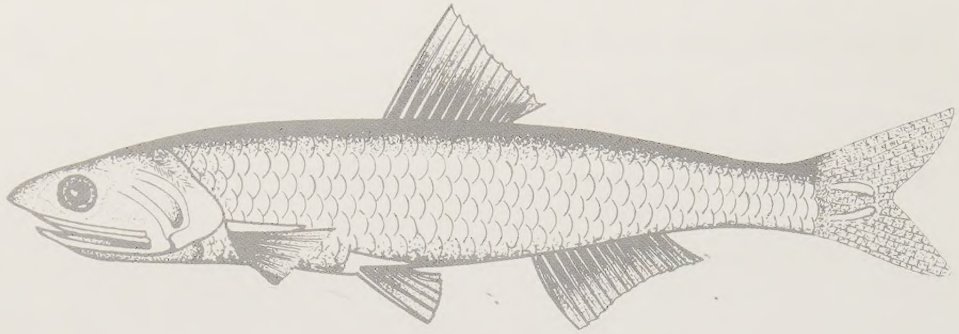
The text was compiled by the editor from contributions by the relevant directorates, subdirectorates and divisions of Marine & Coastal Management, based largely on statistics and information rendered by the fishing industry.



MISSION OF MARINE AND COASTAL MANAGEMENT

To provide for responsible custodianship of South Africa's marine and coastal resources and ecosystems for the benefit of current and future generations of South Africans. This is achieved by the conservation of such resources and ecosystems through the control of, and the orderly, fair and equitable access to, their optimum sustainable utilization. Activities are undertaken in accordance with national and international norms, and are:

- carried out under the auspices of the Department of Environmental Affairs and Tourism in an open, cooperative and accountable manner, subject to Government policy, and
- based on rigorous, multidisciplinary research and monitoring aimed at developing a comprehensive understanding of relevant resources and ecosystems as well as of relevant industries and communities.

EDITORIAL NOTE

The South African Commercial Fisheries Review aims to present the official statistics on the catches, production and monitoring of the South African commercial marine fisheries sector. It also documents changes in legislation, exploited stocks, fishing practices, processing and marketing trends and in fisheries management. More detailed descriptions of the scientific research that is undertaken by Marine and Coastal Management is presented in Research Highlights, the companion series to this one.

Marine and Coastal Management (M&CM) is the new name for Sea Fisheries, which was amalgamated with the Subdirectorate: Coastal Management early in 1999.

1. INTRODUCTION

The year 1996 was a good one for the South African fishing industry. Although the country's total nominal catch dropped from the record level of 592 561 t attained in 1995, the wholesale value of the industry increased significantly, approaching the R2 billion mark. Industrial unrest, which plagued the fishing industry in 1995, was largely resolved and inputs to a new and broadly acceptable Marine Fisheries Policy were presented to the Minister of Environmental Affairs and Tourism in June. The so-called Green Paper was compiled after 18 months of consultation with all stake-holders and interest groups in the fishing industry. It was projected that the policy would be made public in mid-1997 and enacted in 1998.

The outlook for most fisheries remained positive. Catches of Cape hakes - the country's most valuable fish resource - remained stable, although research indicated that the extent of the recovery of hake stocks since the early 1980s may have been overestimated. Revised estimates put the recovery and projected future catches at a slightly lower level than previously anticipated. The hake-directed longline experiment entered its first full year of fishing in 1996 and it was anticipated that the results of the experiment would facilitate a decision on the use of this type of gear in the hake fishery.

The Agulhas sole resource remained stable and good catches were recorded.

Poor catches in the pelagic industry were mainly attributed to the low anchovy catch of 40 712 t. The pilchard fishery appeared to be stable, but remained dependent on good year-classes. Horse mackerel continued to be underfished because of low prices.

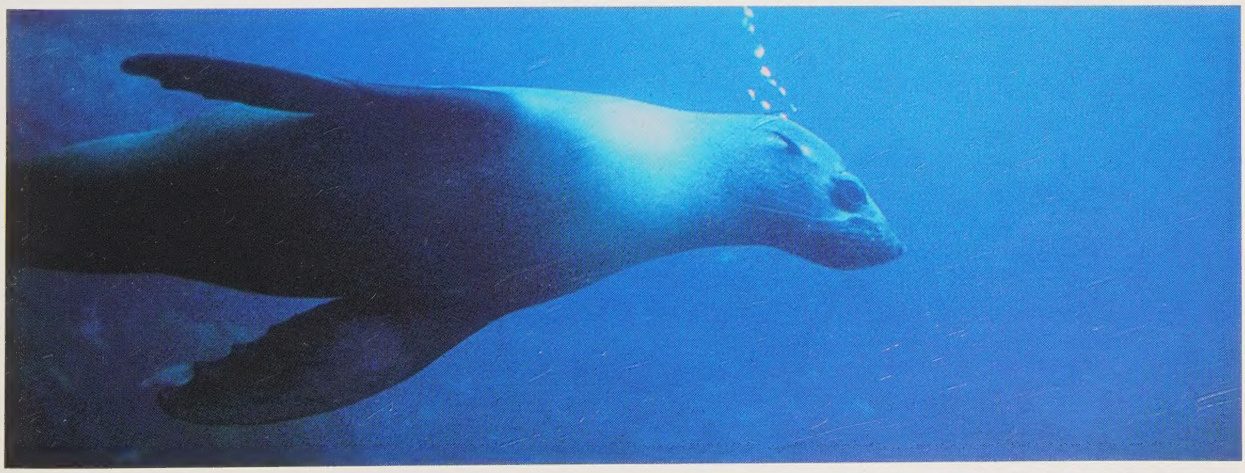
West Coast rock lobster resources remained depressed, but the good catches recorded in 1996 were encouraging. Research suggested that growth rates for the 1995/96 season had increased slightly over previous years.

The South Coast rock lobster TAC was set at a lower level during the 1995/96 season, but catches were stable at this lower level. Catch rate data for the 1995/96 season showed a slight improvement over the previous season's figures.

The abalone resource was threatened by illegal catches and the escalation of the recreational catch. Although the abalone TAC remained at a level of 615 t for the 1995/96 season, the prognosis for the resource was not good. Attempts to curb the poaching near Hermanus occasionally resulted in violence and the SA Police Service was called in to assist M&CM inspectors in maintaining law and order. M&CM representatives continued to meet with illegal abalone fishers who were frustrated by their inability to gain legal access to the resource.

As part of its obligations to the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), M&CM was tasked with managing the fishery for Patagonian toothfish which developed in the vicinity of the Prince Edward Islands during this period. Since little is known about the fishery's potential yield, an exploratory fishery was designed for the region. An integrated scheme using scientific observers and satellite tracking to gather information directly from vessels on the fishing grounds is being developed for this fishery.

M&CM entered a period of profound transformation during 1996. A new directorate was created to manage the marine inspectors and fishing harbour staff who were transferred to M&CM during the previous financial year. The transfer of marine control functions from the provincial government resulted in the Chief Directorates' staff complement doubling in size during this period.



2. THE FISHERY AS A WHOLE

2.1 Total catch

Catch statistics for the 1996 fishing year are presented in Table I. The total catch for 1996 amounted to 461 028 t, which is 22% lower than the 1995 catch. The small pelagic catch, which fell by 42% in 1996, was largely responsible for the smaller total catch.

The demersal catch of 201 412 t was significantly higher than the 1995 catch, which was adversely affected by instability in the fishing industry. Increased catches by participants in the hake longline experiment helped to increase total demersal landings during 1996.

Catches in the pelagic sector were low in 1996. The total pelagic catch fell to 213 669 t from a 1995 level of 368 323 t, largely because of poor anchovy recruitment.

The total rock lobster catch also fell in 1996. Lower TACs for both the West Coast rock lobster and the South Coast rock lobster sectors resulted in a 471 t drop in catches.

Abalone catches remained stable, at 613 t, but the outlook for the abalone resource was bleak owing to the escalation in illegal fishing and an increased recreational take; estimated to be 423 tons for the 1995/96 season.

In the linefish sector catches continued to increase, despite the fact that catch rates for most individual linefish species dropped dramatically in the past few years. There are two main reasons for this apparent contradiction. Firstly, snoek catches in the Western Cape remained high and continued to inflate linefish statistics for the province. Secondly, the tuna catches reported here are approximately 57% higher than those originally submitted for the 1996 tuna fishing season. The South African tuna fishing industry adjusted their 1996 catch records when submitting them to the International Commission for the Conservation of Atlantic Tunas (ICCAT). As a result it is difficult to draw accurate comparisons between the 1996 tuna fishing statistics and catch records for previous years as those might well have been under-reported.

The catch statistics presented throughout this report are a summation of the monthly landings reported by South African fishing companies. As such they are regarded as being quite accurate, particularly in the case of fisheries controlled by TACs; namely the demersal, pelagic, rock lobster and abalone sectors. For fisheries in which the catch is not always landed in the whole state, particularly the demersal fisheries, landings have been converted to nominal catch by the use of scientifically determined conversion factors. For the smaller fisheries, for which the number, rather than the mass of fish caught, is reported, a conversion to mass has been made using the best available information. This applies to the mullet and oyster fisheries in particular.

The monetary values presented in Table II are an estimate, based on the average prices realized by the fishing companies throughout the year. The production figures that are presented in this report are also supplied by the fishing industry.

TABLE I

Total nominal catch and catch per sector of the South African commercial marine fisheries.

	Nominal catch (t)	
Fishery sector	1995*	1996
Seaweeds (wet weight)	8 504	12 913
Bait organisms	11	1.5
Mussels and oysters farmed/fattened	1 996	2 951
Picked oysters and marketable wash-ups	150	92
Abalone	613	613
Whelks and crabs	1.5	-
Periwinkles	-	-
Prawns farmed	77	100
Rock lobster fisheries		
West Coast	1 962	1 517
South Coast	461	435
Subtotal rock lobster	2 423	1 952
Crustacean trawl	541	330
Pelagic fisheries	368 323	213 669
Line fisheries		
Tuna	4 358	5 811
Squid jigging	6 830	7 107
Handline fishery	14 103	12 841
Subtotal linefish	25 291	25 759
Harder and St Joseph fishery	1 377	1 235
Demersal fisheries		
Offshore	159 318	170 722
Inshore	15 238	16 407
Midwater	3 228	8 688
West Coast sole	1	16
West Coast gurnard	501	119
Offal (trash fish)	2 483	-
Longline experiment	2 484	5 460
Subtotal demersal	183 253	201 412
Seals	-	-
Guano	-	-
Total	592 561	461 028

* Updated

2.2 Monetary value of catches and products

The monetary value of the South African fishing industry continued to climb in 1996, despite the fact that catches were down from their 1995 level. Firm prices on local markets as well as strong export sales accounted for this apparent anomaly. Seafood exporters in particular benefitted from their investments in value-added products. A significant depreciation in the value of the South African currency also contributed to higher profits.

Table II shows that the monetary value of most fisheries sectors continued to climb in 1996. The most obvious exceptions to this trend were the pelagic and West Coast rock lobster fisheries. In the case of the pelagic industry, the drop in monetary value was attributed to the significantly reduced pelagic catch which fell to 213 669 t. Interestingly, the drop in the value of the pelagic fishery was not as high as might have been expected with catches so poor. A drop in the value of the South African Rand, and the higher prices realised for fishmeal on local markets accounted for this trend.

Cuts to the TAC were experienced in both the West Coast and the South Coast rock lobster fisheries. Despite a TAC cut of 25 t, the value of South Coast rock lobster products rose to R71 million. However, in the West Coast rock lobster fishery a TAC cut of 480 t had more serious implications for the industry; the value of this sector of the rock lobster fishery dropped by 15% to R102 million.

Demersal fishing is the largest and most valuable sector of the South African fishing industry and contributed more than R1 billion to the total value of the fishery in 1996. Demersal

TABLE II

Estimated values of landings and products of the various South African commercial fisheries.

Fishery sector	Value (R) Free on board (F.O.B.) value	
	1995	1996
Seaweeds	4 215	5 073
Mussels and oysters farmed (including cultivated prawns)	23 586	31 958
Oysters collected	1 431	1 014
Abalone	54 054	56 677
Rock lobster fisheries		
West Coast	120 945	102 217
South Coast	64 352	71 038
Subtotal rock lobster	185 297	173 255
Crustacean trawl	11 261	12 641
Pelagic fishery	403 835	365 942
Linefisheries		
Tuna pole fishery	24 303	12 897
Squid-jigging	102 390	156 332
Handline fishery	90 253	93 153
Subtotal linefish	216 946	262 382
Mullet and St Joseph fishery	1 753	4 006
Demersal fisheries		
Offshore and Midwater	744 508	924 013
Inshore	60 722	76 493
Hake longline experiment	26 520	39 976
Subtotal demersal fish	831 750	1 040 482
Guano	0	0
Total	1 734 128	1 953 430

products, comprising mostly the Cape hakes, accounted for 51% of the total value of the South African fishery. Since a substantial proportion of earnings in the demersal sector is derived from exports, the growing international recognition of South African hake as a high quality and competitively priced whitefish, enabled exporters to obtain firmer prices for their products. A strong demand for hake on local markets also contributed to the burgeoning value of this fishery.

In 1996 the linefish sector contributed more towards the total value of the South African fishery than the rock lobster fishery. This was a new trend for which there were two main reasons. Firstly, good squid catches were made and the export price for squid increased in 1996. If the falling value of the rand is considered, squid exporters effectively benefitted from a 30% rise in the squid price. Secondly, the reduced value of the West Coast rock lobster fishery caused by the cut in the annual TAC.

2.3 The South African commercial fishing fleet

The licensed South African commercial fishing fleet totalled 4 885 vessels during the 1995/96 fishing season (Table III). Some 80% of these vessels measured 8m or less and were used predominantly in the rock lobster and mullet fisheries on the West Coast, but also to a considerable extent in the handline fishery. The balance were larger vessels; decked motor boats, purse-seiners and trawlers used predominantly in the fisheries for pelagic and demersal fish, East Coast crustaceans and South Coast rock lobster. In addition to being licensed as fishing vessels, about 125 of the larger vessels were also licensed as factories in 1996.

The number of factory vessels increased in 1996, probably due to the fact that some of the smaller vessels in the squid fishery were replaced by slightly larger vessels with processing capabilities.

Beach net fishers admire their haul

In all, the size of the South African fishing fleet grew by 212 vessels during the 1995/96 season. The sudden increase in the number of vessels can be explained by the fact that a new boat registration system was introduced by M&CM during this season. A loophole in the new system was exploited by many boat owners who effectively split the semi-commercial linefish (B) and tuna (T) permits that they had previously held for one vessel, and registered two vessels. This system was amended in the following fishing season and in 1997 the number of registered fishing vessels dropped to a pre- 1995 level of 4 661.

TABLE III: Licensed South African commercial fishing vessels for the 1995/96 fishing season

Registration area	Registration code	5m	5-8m	8-12m	12-20m	20-25m	>25m	Regional totals
Port Nolloth	PNA	146	5	0	4	1	0	156
Hondeklip Bay	HB	42	0	0	4	0	0	46
Vredendal District (including Doring Bay)	VR	115	1	1	4	0	0	121
Lambert's Bay	ADF	195	26	36	5	8	0	270
Piketberg District (including Elands Bay and Velddrif)	PQ	351	50	3	4	12	3	423
Saldanha Bay area	SBH	217	92	10	15	12	35	381
Vredenburg District (including Paternoster and St Helena Bay)	SH	319	81	28	14	22	12	476
Table Bay area (including Bok Bay and Yzerfontein)	CT	104	211	5	0	0	2	322
Cape Town Harbour	CTA	0	0	3	86	12	79	180
Hout Bay	HTB	7	23	16	75	17	3	141
Simonstown Harbour	STH	4	3	7	4	0	0	18
Simonstown area (including Cape Point and False Bay areas)	ST	130	161	0	0	0	0	291
Kalk Bay	KB	8	26	36	9	1	0	80
Somerset West District (including Gordon's Bay)	SW	81	146	12	5	0	0	244
Caledon and Hermanus Districts (including Hawston)	C	77	56	0	2	0	0	135
Gans Bay (including Klein Bay and Pearly Beach)	DDF	69	63	1	8	7	0	148
Bredasdorp District (including Waenhuiskrans and Struis Bay)	BR	39	133	24	1	0	0	197
Heidelberg District (including Witsand and Infanta)	SM	8	26	0	0	0	0	34
Riversdale District (including Still Bay and Puntjie)	R	41	137	2	0	0	0	180
Mossel Bay	MBA	5	30	19	23	20	3	100
George District	G	4	8	0	0	0	0	12
Knysna District (including Plettenberg Bay)	KN	14	68	5	10	0	0	97
Humansdorp District (including Jeffreys Bay and Oyster Bay)	H	11	126	18	17	0	0	172
Port Elizabeth area	PEA	8	65	16	104	19	16	228
Port Alfred District	P	6	103	15	3	0	0	127
East London area	ELA	3	25	3	1	0	0	32
Durban area	DNA	0	9	14	6	2	24	55
KwaZulu-Natal coast	N	18	189	10	0	0	0	217
Former Transkei	TK	0	2	0	0	0	0	2
Total (1995/96)		2 022	1 865	284	404	133	177	4 885
Total (1994/95)		1 980	1 756	266	381	131	159	4 673

Kelp is harvested for the production of a plant growth stimulant

TABLE IV: Seaweeds gathered and exported (kg dry mass)

Concession area (C.A.)	Kelp: Mixed *Ecklonia maxima* & *Laminaria* spp.		*Gelidium* spp.		*Gracilaria verrucosa*		Total	
	1995	1996	1995	1996	1995	1996	1995	1996
				Gathered				
Ciskei *	-	-	9 676	16 093	-	-	9 676	16 093
Transkei #	-	-	20 092	34 312	-	-	20 092	34 312
Transkei +	-	-	7 728	21 324	-	-	7 728	21 324
1	-	-	73 312	67 014	-	-	73 312	67 014
2	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-
5-8	113 621	308 856	-	-	-	-	113 621	308 856
9	†	¥	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-
11	23 783	-	-	-	-	-	23 783	-
12	-	-	-	-	-	-	-	-
13-14	202 585	522 729	-	-	-	-	202 585	522 729
15	192 063	426 262	-	-	-	-	192 063	426 262
16	142 612	258 416	-	-	-	-	142 612	258 416
17	-	-	-	-	429 326	189 650	429 326	189 650
Total	674 664	1 516 263	110 808	138 743	429 326	189 650	1 214 798	1 844 656

* Taurus Chemicals
\# Taurus Products
\+ Wild Coast Industries
† Excludes 315 615 kg wet mass (dry mass c. 47 342 kg if 85% moisture assumed) of kelp harvested in area 9
¥ Excludes 405 300 kg wet mass (dry mass c. 60 795 kg if 85% moisture assumed) of kelp harvested in area 9

3. FISHERY SECTORS

3.1 Seaweeds

The South African seaweed industry is based on the collection of kelp from the cool waters between Cape Agulhas and the Orange River, *Gracilaria* from Saldanha Bay, and *Gelidium* from the warmer waters of the Eastern Cape.

In order for the Department to manage these seaweed resources, the coast of the former Cape Province was divided into 17 concession areas. In recent years the seaweed resources in the former Transkei and Ciskei, previously not the responsibility of the Department, have become so. However, until the concession system is revised, the names of the areas remain as shown on Table IV.

Collections of beach-cast kelp increased in 1996, as a result of improved overseas markets and new export opportunities created by political change. Collections of beach-cast kelp tend to vary with demand for the raw material, and are not an indication of availability.

At Kommetjie on the Cape Peninsula, the kelp *Ecklonia maxima* is harvested fresh for the production of an agricultural and horticultural plant-growth stimulant. Annual harvests have increased fairly steadily since the launch of this product, as global sales have grown.

Gracilaria wash-ups at Saldanha Bay fell dramatically in 1996. These wash-ups depend on the right combination of growing conditions for the natural populations, and then wind and swell to bring large quantities ashore. As a result, annual yields are highly variable, making this local industry rather unstable. Ultimately, the industry can only be stabilized by cultivating *Gracilaria* on a large scale, as is done at Lüderitz, Namibia.

In the Eastern Cape, the *Gelidium* harvest increased between 1995 and 1996, mostly as a result of improved weather conditions during collecting (which can only be done at low spring tides). The three species that make up the harvest are all exported to the East, where very high quality agar is extracted.

3.2 Bait organisms

Five permits were issued for the collection of white mussels, *Donax serra*, on the West Coast, as opposed to eight permits in previous years. *Donax serra* is a popular angling bait and permits are only issued to people who have direct marketing outlets to anglers. Total landings dropped from a 1995 level of 46 474 mussels to 40 756 for 1996, possibly because there were fewer marketers in 1996.

No commercial landings of the sand clam, *Mactra glabrata*, were recorded in 1996.

3.3 Mariculture

In all, 34 permits were issued to, or renewed by, 21 different companies during 1996, compared with 35 permits issued in 1995. Of these, 12 were for the farming of oysters, 13 for abalone culture, and three for black mussels. Two permits were issued to mariculture farms to market the redbait that is a by-catch of their industry. Only one of the two permit-holders recorded a landing of 715kg of redbait.

The cultivation of oysters takes place mainly at Knysna, Port Elizabeth and Saldanha Bay, while abalone are primarily grown near Hermanus. Production figures for the cultivated oyster, *Crassostrea gigas*, totalled 4.8 million, which is approximately 700 000 more oysters than were produced in 1995.

Permits for the cultivation of the Spanish mussel, *Mytilus galloprovincialis*, were issued to companies in Saldanha Bay, Stompneus Bay and St Francis Bay. In total, 2 600 t were produced, which was an improvement on the 1995 figure of 1 700 t.

3.4 Wild oysters

For the first time in this series of reports, the figures that are presented in Table V on p.8 under the heading "natural picked and marketable wash-ups" include the figures from KwaZulu-Natal. The table shows that the number of wild oysters collected from the intertidal area of the South African coastline decreased significantly in 1996. Along the Southern Cape, legal-sized oysters were collected by "pickers" working for eight concessionaires in 12 active concession areas. In addition to this, 60 384 undersize wash-ups were collected. The closed season for commercial pickers – 1 December to 15 January – remained in place.

Oyster landings in the smaller KwaZulu-Natal fishery remained fairly stable, at a level of 308 000 oysters, although the take was down on the 1995 figure of approximately 440 000 oysters.

Data from the KwaZulu-Natal recreational oyster fishery shows that approximately 41 723 oysters were collected by this sector during 1996.

3.5 Abalone

Wild abalone fisheries worldwide are difficult to manage for many reasons, including very slow growth rates, the aggregating behaviour of the animal, accessibility and its vulnerable reproductive strategy. Probably for these reasons, abalone fisheries worldwide have had a history of sudden and unpredicted collapse. Management of the South African abalone fishery has followed a conservative approach, with small annual changes in quota or TAC.

TABLE V: Commercial oyster production and marketers

Locality/Product	Number of size oysters		Number of marketers*
	1995	1996	
Natural picked and marketable "wash-ups"	1 182 613	650 877	13
Cultivated and fattened wash-ups			
Saldanha Bay	887 789	931 533	
Knysna	2 775 371	3 264 678	
Port Elizabeth**	180 000	210 400	
Other areas	278 862†	28 221#	
Subtotal cultivated and fattened	4 102 022	4 434 832	
Total	5 284 635	5 085 709	

* Marketers involved in more than one concession area or activity were counted separately for each

** Includes fattened wash-ups. There were 60 384 undersize wash-ups in 1996

\# Port Alfred

† Alexander Bay, Port Nolloth, St Francis Bay and Port Alfred

Annual landings per diver hour, as well as indices derived from size composition data for each of the fishing zones, provide the baseline information on which the fishery is managed. The Fishery Independent Abalone Survey (FIAS) also contributes to the accurate collection of data for the fishery. Catch and catch per unit effort (*cpue*) for each zone are shown in Table VI. This table compares catch rates for the 1994/95 season with those of the 1995/96 season.

A total TAC of 615 t was set for the 1995/96 abalone season which began late, on 18 December 1995. Two extensions to the commercial season were given because heavy seas made it difficult for certain operators to fill their quotas.

A TAC of 205 t was set for Zone A (Quoin Point to Pearly Beach). Catch rates continued to decrease slightly in this zone. Careful monitoring of catch rates for Zone A was to take place during the following season.

In Zone B (Franskraal to De Kelders), the TAC of 150 t was maintained for the fourth consecutive year. *Cpue* values increased.

Although there was concern over the long-term effect of poaching in the Mudge Point/Hawston area, it was decided to maintain a TAC of 130 t for Zone C (Hermanus to Hawston). Catch rates for this zone decreased markedly and remained the lowest in the fishery.

The size of Zone D (Kleinmond to Holbaai Point) was increased for the 1992/93 season by the reincorporation of a relatively pristine new area. This resulted in abnormally high *cpues* as divers harvested these abalone aggregations. Accordingly the TAC was raised to 90 t for the previous two seasons. This TAC was retained for the 1995/96 season. Catch rates in this zone declined slightly.

The two West Coast zones, E and G, remained closed to commercial operators because of an inability to sustain significant levels of commercial harvest. This may be due to intermittent recruitment failure and, as a result, both grounds were reserved for recreational use.

A TAC of 15 t was maintained for Robben Island (Zone F). When the first TAC of 50 t was introduced in 1985/86 for this previously unfished area, it was on the understanding that this harvest level was unlikely to be sustainable in the long term. TACs were subsequently reduced in two stages to 15 t following a cautious approach motivated by the known intermittent recruitment patterns found there.

Dyer Island was harvested at a conservative level in order to sustain an above-average population. This policy was aimed at supplying abalone larvae to adjacent, heavily fished coastlines. As a result the TAC for this area was retained at 25 t.

Recreational abalone landings, which fluctuated between 300 and 500 t between 1990 and 1996 were estimated to be 423 t for the 1995/96 season. For the first time since recommendations were made to curtail the expanding recreational fishery, a three-month reduction of the recreational abalone season was approved for the 1996/97 season. This was seen as a positive development for the resource, which is under severe pressure at present.

Poaching remained a major threat to the sustainability of future abalone harvests. Research showed that the Mudge Point/Hawston area (Zone C), which is the centre of poaching activities, was showing clear signs of overexploitation. During the 1995/96 season poaching spread to more remote areas and a high level of illegal fishing was recorded in Celt Bay and Buffeljags. Samples from confiscated hauls showed that most illegal abalone hauls contained a high proportion of undersize animals. Drastic reductions to future TACs are anticipated unless poaching can be curtailed.

TABLE VI

Catch and catch rate (*cpue*) for the seven abalone fishing zones for the 1994/1995 and 1995/1996 seasons

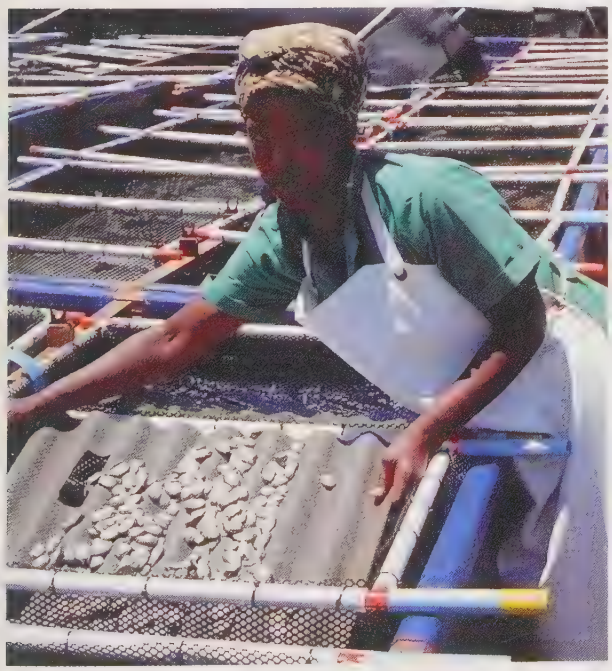
Zone	Area	Catch (t)		Catch rate (kg.diver-h^{-1})	
		1994/95	1995/96	1994/95	1995/96
A	Quoin Point - Pearly Beach	208	206	150	147
B	Franskraal - De Kelders	152	146	160	144
C	Hermanus - Hawston	123	130	108	84
D	Kleinmond - Holbaai	90	89	165	153
E	Cape Point - Mouille Point	-	-	-	-
-	Dyer Island	25	26	169	186
F	Robben Island	15	15	366	427
G	Table Bay - Cape Columbine	-	-	-	-
	All zones	614	613	145	130

Note: The catches and catch rates listed in this table in the 1995 issue of this report were incorrect. They have been amended here.

TABLE VII: Commercial production for abalone

Commodity (kg)	1994/95	1995/96
Canned products*	64 949	84 489
Frozen pieces	14 290	40 236
Frozen whole	1 691	8 100
Fresh/live (in shell)	81 423	66 722
Dried abalone	33	221
Total	162 386	199 768

* To convert to whole mass, multiply canned products by 4, frozen pieces by 3, frozen whole by 1, fresh/live by 1 and dried by 10



Thirteen permits were issued to abalone farmers in 1996

A trend towards exporting live abalone continued in the 1995/96 season. More than 66 t of abalone were exported in this way. However, canning is still the most common way of preparing abalone for export and 84 t of abalone were exported in this form during 1996.

3.6 Limpets

A permit was issued late in 1995 for the collection of 14kg of *Patella granatina* and 19kg of *P. argenvillei* in order to test the viability of exporting limpets to overseas markets. A second permit was issued in December 1996 for the collection of 500 *P. argenvillei*, 500 *P. granatina* and 500 *P. granularis*. Neither of the permit-holders made application for futher export permits.

3.7 Periwinkles

An experimental permit was issued for the harvesting of 10 t of *Turbo cidaris* and 2.2 t of *Oxystele sinensis*. Harvesting of differing intensities was to take place at three sites along the coast. The permit-holder collected a few small sample batches with the intention of testing the overseas market. However a sudden decline in periwinkle stocks between Cape Hangklip and Walker Bay severely affected the viability of the experiment. The decline in periwinkle stocks was most likely attributable to an influx of West Coast rock lobster, *Jasus lalandii*, to this region. Rock lobster are known to prey on invertebrates such as periwinkles.

TABLE VIII

Permits for jigging (C), processing (F) and transporting (X) squid issued to licensed South African commercial fishing vessels during the 1995/96 squid fishing season. Also shown are the number of restricted permits (R) issued and the numbers of licensed crew in each region

Registration area*	C	Crew	F	Crew	X	Crew	R**	Crew
CTA	2	32	0	0	0	0	0	0
HTB	16	303	28	570	0	0	0	0
KB	29	288	2	49	1	4	27	258
DDF	2	40	4	90	0	0	0	0
R	1	7	0	0	0	0	1	7
MBA	5	67	2	52	0	0	2	18
G	0	0	0	0	1	4	0	0
KN	6	61	0	0	1	4	1	4
H	37	376	10	169	17	60	0	0
PEA	71	1 206	130	2 537	3	12	1	6
P	17	129	2	37	1	4	13	90
ELA	1	22	2	50	0	0	0	0
Total	187	2 531	180	3 554	24	88	45	383
Total squid permits	436							
Total crew	6 556							

* The registration codes are explained in Table III on p.5

** Restricted permit-holders are limited to certain areas and catch squid for bait purposes

3.8 Sea urchins

An experimental permit was issued for the harvesting of 10 t of sea urchin, *Parechinus angulosus*, north of Cape Town. A feasibility report on the project revealed that, on the West Coast, urchin roe yields were too low to sustain a commercial harvest. On the East Coast yields were acceptable, but no harvesting was permitted on this coast because of the vital role that sea urchins play in the life cycle of abalone. Juvenile abalone are known to shelter under sea urchins during the period of their life cycle when they are most vulnerable to predators.

3.9 Cephalopods

Methods for accurately assessing stocks of the chokka squid, *Loligo vulgaris reynaudii*, have so far remained elusive, primarily because squid aggregations are very mobile and little is known about the morphology, behaviour and distribution of these short-lived animals. Recent strides in this field have been made by in-house researchers and it is hoped that greater knowledge about squid stocks will help to provide more efficient advice on the management of the fishery.

Chokka squid are the target of the only directed cephalopod fishery in South Africa. In the mid-1980s the squid-jigging fishery began to replace the trawl bycatch fishery. Since then, increased pressure has been brought to bear on the resource, in the form of new applications, new permit conditions, creeping effort increases and the assumed increasing take of the "recreational fishery". Stock assessments have shown a pronounced decline in squid abundance between 1971 and 1994, although the results of more recent demersal surveys suggest an increase in abundance.

During 1996 the number of boats participating in the squid-jigging fishery declined from around 300 in 1995 to 240 in 1996. Although these figures appear to suggest a decrease in effort, the opposite is in fact true. Some of the smaller boats that previously took part in the fishery were replaced by larger vessels that were able to stay on the fishing grounds for longer periods of time and which include non-fishing crew in their teams. The use of strong lights and support vessels also increased with the move to using larger vessels.

In 1996 jig catches increased slightly from a 1995 level of 6 830 t to 7 107 t, which suggests that the fishery has remained relatively stable in the past four years. Highest catches were made in December (999 t), but as in previous years, greatest abundance was probably in November (647 t in 8 days). The squid season was closed for the

remainder of November (between October 25 and November 22). The best fishing area was Port Elizabeth (1 610 t) and good catches were also recorded farther west, in the Plettenberg Bay area (1 404 t).

Trawled squid constituted only 8% of the squid catch, despite the fact that red squid catches almost doubled in 1996 (Table IX). Catches of chokka squid made by trawlers also increased, from 339 t in 1995 to 384 t in 1996.

The catch of Indian Ocean luminous squid, *Loligo duvauceli*, reported from the East Coast crustacean fishery, dropped to below 400kg. Octopod catches were also significantly lower, dropping from a 1995 level of 22 884 kg to 11 470 kg (Table X).

TABLE IX

Squid catches (t) by various sectors of the fishery

Sector	1995	1996
South African trawl		
Red squid	19	34
White squid (chokka)	339	384
Subtotal trawl	358	418
Crustacean trawl	2	*
Jigging	6 830	7 107
Total all sectors	7 190	7 525

* Less than 0,5 t

TABLE X

Cephalopod catches (in kg) off KwaZulu-Natal by the East Coast crustacean fishery

Species	1995	1996
Squid	2 324	320
Octopus	22 884	11 470
Cuttlefish	17 189	10 070
Total	42 397	21 860

The spawning behaviour of chokka squid *Loligo vulgaris reynaudii* is captured in this unusual photograph

TABLE XI: Actual catches of West Coast rock lobster in 1994/95 and 1995/96 and total allowable catches (TACs) for the 1994/95 and 1995/96 seasons per fishing zone.

Area	Number	Zone	Actual catch (t) 1994/95	Actual catch (t) 1995/96	TAC (t whole) 1994/95	TAC (t whole) 1995/96
Port Nolloth	1	A	27	30	46	30
Hondeklip Bay	2					
Lambert's Bay	3	B	69	13		
Elands Bay	4		433	360	494	368
St Helena Bay	5	C		14		
Saldanha Bay	6		130	40	123	60
Dassen Island	7	D	316	267	345	265
Cape Peninsula†	8		932	745	935	747
Hout Bay/Oudeschip	10		28	30	30	30
False Bay	11	E	27	18	27	20
Total			1 962	1 517	2 000	1 520

* Updated

TABLE XII

Sales of West Coast rock lobster products

Commodity (kg as specified)	Mass (kg)	Price (R/kg)	1996 (R'000)	1995 (R'000)
Frozen tails	34 003	129.024	4 395	2 507
Whole frozen, cooked	670 349	72.74	48 762	48 479
Whole frozen, raw	115 923	67.88	7 869	32 298
Live	498 133	82.69	41 191	37 661
Total			102 217	120 945

3.10 Crustaceans

3.10.1 West Coast rock lobster

During the early 1990s, sharp declines in rock lobster growth rates and catch rates resulted in dramatic reductions in TAC. This impacted heavily on the financial viability of the West Coast rock lobster commercial fishery. In an attempt to address this issue by allowing the industry access to the smaller rock lobster required by the lucrative oriental market, the minimum size limit for commercial fishers was dropped from 89mm to 75mm for the 1993/94 season. Mathematical models were used to illustrate that the practice of discarding large numbers of small rock lobsters was detrimental to the resource. As a result, the 75 mm size limit was retained for the 1995/96 season and a total TAC of 1 520 t was set. This represented a 24% drop in TAC from the previous season's allowable catch of 2 000 t.

As usual, the fishing season started in October 1995. Fishing companies filled their quotas timeously, and catches were in good condition. Research suggested that growth rates during the 1995/96 season increased slightly over those of previous years. This explained the high proportion of female and undersized lobsters in the fishing gear.

Following the trend of the previous two seasons, *cpue* increased slightly in the south (areas 6, 7 and 8). Long-term changes in the northern Benguela system are thought to be responsible for the fact that the far northern fishing grounds (areas 1 and 2) have become relatively less productive through their influence on the frequency of nearshore anoxic events. Correspondingly, the grounds slightly south of that (areas 3, 4 and 5) have become proportionally more productive.

TABLE XIII Catch (kg) and catch per unit effort (kg.trap-day^{-1}) in the four areas of the South Coast rock lobster fishery

Area	1994/95		1995/96	
	Catch	Cpue	Catch	Cpue
Port Alfred	43 972	0,177	35 838	0.158
Port Elizabeth	126 155	0,127	73 931	0.119
St Francis	183 692	0,122	187 900	0.103
Agulhas Bank	107 610	0,155	137 576	0.250
Total	461 429	0,134	435 245	0.135

TABLE XIV Production of South Coast rock lobster commodities

Commodity (kg as specified)	Mass (kg)	Price (R/kg)*	1996 (R'000)	1995 (R'000)
Frozen tails	250 802	190	47 652	45 943
Whole frozen, raw	144 801	73	10 570	3 425
Live	147 880	86.67	12 816	10 548
Unsold stock	-	-	-	5 040
Total			71 038	64 352

* Quoted price is 1996 rate

The bulk of the catch for Zone B was taken at Elands Bay (Table XI). Better catch rates there were responsible for this concentration of effort. Catches dropped by half in Zone C - the St Helena Bay, Saldanha Bay region - largely because of a black tide in 1994, which resulted in massive rock lobster strandings. This was compounded by heavy mortality within the macrobenthic community, resulting in a lack of food for surviving rock lobsters.

Comparative market sales figures show that earnings for the 1995/96 season were down on the previous season's figures. This is largely attributable to the drop in TAC from 2 000 t to 1 520 t. Sales remained relatively constant, with the bulk of the West Coast rock lobster catch being exported in a whole cooked state. Sales of frozen tails continued to decline in favour of whole product and accounted for the smallest proportion of the export market (Table XII).

Catches in the recreational rock lobster fishery continued to climb, from an estimated 1994/95 level of 336 t to a 1995/96 figure of 380 t.

3.10.2 South Coast rock lobster

In all, 14 South Coast rock lobster longline trap boats operated on the South Coast fishing grounds, each fishing with 3 000 - 6 000 plastic traps. Fishing during 1996 was offshore, at depths of between 60 and 200m, between East London in the east and Cape Point in the west, and up to 200 km offshore on the Agulhas Bank. The fishing grounds were traditionally divided into four management zones, but reference to these has fallen out of use.

A TAC of 450 t tail mass was introduced in 1984/85 and this increased to 477 t with the addition of a 25 t allocation made for the Ciskei in 1990/91 and an annual 2 t research quota allocated since 1987/88. Prior to 1994/95 the TAC was based on past performance of the fishery. From that season onwards the TAC was derived from a rigorous annual resource assessment debated by fisheries scientists from various organizations in a formal working group forum. This assessment included the standardization of the *cpue* data to reflect the influence of factors such as fishing season, month, fishing area, trap-soak-time, fishing vessel and technological progress on the catch rates. The standardized *cpue* series is then used in a surplus production model of the resource, with the impact of candidate TACs for the coming season on variables such as population biomass and MSY obtained according to a an advanced numerical procedure. The 1994/95 assessment showed that the biomass was declining at approximately 2% per annum, and that a TAC of 477 t tail mass would not be sustainable in the long term.

TABLE XV

Landings (kg whole mass) of the East Coast crustacean trawl fishery in KwaZulu-Natal

Species	1995	1996
Inshore prawns (Tugela prawns)	32 357	53 320
Offshore prawns (pink prawns)	132 622	51 580
Langoustine	63 624	46 430
Shrimp	9 271	1 940
Rock lobster	13 326	10 390
Inshore crab (Tugela crab)	1 785	520
Offshore crab (Red crab)	146 258	82 150
Squid	2 324	320
Octopus	22 884	11 470
Cuttlefish	17 189	10 070
Mixed fish	70 372	62 170
Total	512 012	330 360

There was consensus among scientists that the TAC of 477 t should be reduced in four phases, of which the first was implemented in 1994/95 (452 t including the Ciskei quota and 2 t for research) and the second in 1995/96 (427 t including the Ciskei quota and 2 t for research).

Most effort was directed in the St Francis Bay region and 40% of the total catch was reported from there. Over the Agulhas Bank, catches improved from the 1994/95 level of 108 t to 138 t after falling to a record low of 72 t in 1993/94. *Cpue* data for the 1995/96 season showed a slight improvement over the previous season's figures (Table XIII), but this was not significant.

The value of South Coast rock lobster products increased slightly in the 1995/96 season, despite the lower TAC (Table XIV). This is largely attributable to higher export prices and the fall in the value of the Rand.

3.10.3 East Coast crustaceans

Eight permits were issued for prawn trawling in South African waters in 1996. As for previous years, five of the permits allowed vessels to trawl within seven nautical miles of the coast, allowing access to the inshore resource (Tugela prawns). The remaining three vessels were licensed to fish for the offshore resource (pink prawns), outside the seven nautical mile limit.

Catches of Tugela prawns increased in 1996 to 53 t, but landings of pink prawns fell dramatically from a 1995 level of 133 t to 52 t. Catches of langoustines also fell in 1996, to a level of 46 t. (Table XV).

When compared to other commercial fisheries in South Africa, the prawn-directed fishery is small, but bycatch proportions are high. In 1996 the bycatch figures for the prawn fishery were lower than for previous years. For instance, cephalopod catches dropped by almost 50% to 22 t.

The experiment to test the viability of a commercial fishery for *Palinurus delagoae*, the deep-sea rock lobster found off the coast of KwaZulu-Natal, continued in 1996. Catches suggested that the fishery has very limited potential. Annual relative abundance indices over the three-year period of the experiment declined by 40% in the northern region, 47% in the central region and 87% in the southern region of KwaZulu-Natal. It appeared that, at depths of 200 – 400m, there are few patches of hard substrata where the lobsters occur in sufficiently high numbers to justify commercial fishing. The experiment continued in 1997.

3.11 Pelagic fish

3.11.1 Catch

The pelagic fishery continued to be managed according to a combined species Operational Management Procedure (OMP), which was implemented at the start of the 1994 season. The combined OMP ensures that anchovy *Engraulis capensis* and pilchard *Sardinops sagax* TACs are set together, in terms of a single, multispecies approach.

For operational reasons a provisional TAC for pelagic fish is recommended in October each year, prior to the November spawner biomass survey. The TAC is recommended in January or February, taking into account the results of the November survey. This initial recommendation is then revised after the midyear pelagic recruit survey. The OMP makes allowance for revisions to the TACs for both anchovy and pilchard bycatch, on the basis of midyear scientific surveys.

In the 1996 fishing season the initial TAC for pilchard-directed catch was set at 58 000 t. For anchovy and pilchard bycatch the initial TACs were set at 150 000 t and 30 100 t respectively.

Following discussions with the pelagic industry and taking socio-economic criteria into consideration, the Sea Fisheries Advisory Committee recommended that, between April and the midyear recruit survey, fishing should continue until either 40 000 t of pilchard bycatch or 100 000 t of anchovy had been caught.

However, the midyear recruit survey showed that recruitment of anchovy, both in terms of numbers of fish and biomass, was the lowest since the inception of acoustic

TABLE XVI

Catches (t) made by pelagic vessels in South African waters during 1995 and 1996

Month	Anchovy	Pilchard direct	Pilchard bycatch	Horse mackerel	Mackerel (chub)	Round herring	Lantern-fish	Other*	Total '96	Total '95
January	3 679	1 721	2 261	3 974	13	441	4	57		
February	5 480	5 189	6 346	3 864	83	5 985	10	12		
March	2 788	7 889	2 648	7 772	81	8 267	17	352		
April	3 853	3 778	4 965	499	85	7 338	0	11		
May	10 078	6 519	6 686	680	42	20 331	1	11		
June	14 548	5 573	4 816	320	38	3 936	0	18		
July	242	5 470	535	611	266	397	0	5		
August	1	7 108	288	555	85	153	0	17		
September	2	9 117	162	373	276	146	0	19		
October	21	9 850	139	113	8	30	0	44		
November	19	11 817	43	46	54	79	0	33		
December	0	2 185	24	182	71	13	0	8		
Total 1996	40 712	76 216	28 913	18 988	1 101	47 117	33	589	213 669	
Total 1995	170 308	72 721	42 480	1 991	2 668	76 858	862	435		368 323

* Juvenile gurnard, mantis shrimps, snoek, buttersnoek, hake, jellies and ice but also small quantities of other species

recruitment surveys in 1985. As a result, the final TAC for anchovy was set at 70 000 t and for pilchard bycatch the TAC was set at 35 000 t. However, as a result of an agreed conversion of 1 t pilchard bycatch for 3 t pilchard directed catch, the final pilchard directed TAC was set at 76 000 t and the pilchard bycatch TAC was set at 29 000 t.

The total pelagic catch for 1996 was 213 669 t, a figure well below the previous season's catch of 368 323 t (Table XVI). Poor catches were attributed to the low anchovy catch of 40 711 t attributable to poor recruitment in 1996 and low November biomass levels since 1994. This was 76% lower than the 1995 catch of 170 308 t.

The spawner biomass survey conducted in November 1996 showed that the anchovy biomass was the lowest ever estimated (143 000 t), confirming the poor anchovy recruitment observed earlier. These results were consistent with the difficulties encountered by the fishing industry in filling their quotas.

Round herring *Etrumeus whiteheadi* catches dropped from the 1995 record level of 76 858 t to 47 117 t. Although round herring is not as easily caught as anchovy, it is suitable for processing into meal and oil. As a result it is likely that the difficulties experienced in the anchovy fishery may lead to an increase in fishing pressure on round herring.

Chub mackerel *Scomber japonicus* catches declined from 2 668 t in 1995 to 1 101 t in 1996.

3.11.2 Fishing fleet

There were 87 purse-seiners with 97 pelagic permits at the end of the 1996 pelagic fishing season, compared with 92 vessels and 119 permits in 1995 (Table XVII).

The number of privately owned vessels (P2) dropped from 16 vessels to 13 and the factory-owned vessels (P3) were, at 51, one fewer than in 1995. No permits were issued for catching anchovy for direct human consumption (P4). This was a result of the reduced availability of large anchovy for human consumption and therefore reduced quotas. The number of permits issued to purse-seine for dead bait (M), also dropped from 31 to 28, as did the number of vessels permitted to catch live bait for tuna fishing (Z).

Most (78) pelagic vessels had a single purse-seining permit. Only eight vessels were issued with two permits each and a single vessel qualified for three permits, comprising two bait permits and a factory boat permit.

3.11.3 Production

The production of fishmeal, fish oil and canned fish by pelagic fish processors in the South Western Cape is detailed in Table XVIII.

TABLE XVII: Permits issued to licensed South African vessels to purse-seine pelagic fish in 1995 and 1996

Registration area*	ADF	PQ	SH	SBH	CTA	HTB	C	DDF	PEA	KB	ELA	Total permits 1996
P2-privately owned	-	5	1	1	-	-	-	6	-	-	-	13
P3-factory owned	6	6	25	5	1	6	-	-	2	-	-	51
P4-human consumption		-	-	-	-	-	-	-	-	-	-	-
M-pilchard bait	1	2	4	2	3	5	1	2	4	4	-	28
Z-live bait	-	-	-	-	2	1	-	-	1	-	1	5
Total pelagic permits issued	7	13	30	8	6	12	1	8	7	4	1	97
1 pelagic permit per vessel	5	11	24	6	6	10	1	6	4	4	1	78
2 pelagic permits per vessel	1	1	3	1	-	1	-	1	-	-	-	8
3 pelagic permits per vessel	-	-	-	-	-	-	-	-	-	-	-	1
Total vessels	6	12	27	7	6	11	1	7	5	4	1	87

* The codes for registration areas are explained in Table III on p.5

TABLE XVIII: Pelagic fishing industry: production of South Western Cape factories in 1996

Company	Factory	Fishmeal (t)	Fish oil (t)	Canned fish (cartons)	Canned fish (t**)
Gansbaai Marine	Gans Bay	3 709	259	558 000	9 331
Marine Products	Laaiplek	4 104	226	430 000	7 596
Premier Fishing	Saldanha	6 375	552	373 000	6 431
West Point Processors	St Helena Bay	5 881	418	540 000	9 310
Oranjevis***	St Helena Bay	4 720	486	733 000	12 638
Oceana Fishing	St Helena Bay*	3 800	266	1 142 000	19 690
Oceana Fishing	Hout Bay*	5 400	456	0	0
Oceana Fishing	Lambert's Bay*	6 188	465	0	0
Oceana Fishing Total		5 388	1 187	1 142 000	19 690
Industry Total		40 177	3 128	3 776 000	64 996

* Estimate for fishmeal and fish oil
** Tons caught for canning
*** Figures for Port Elizabeth are included

3.12 Linefish

Altogether, 2 408 of the 3 122 vessels licensed (Table XIX) submitted monthly catch returns to the National Marine Linefish System for 1996. They reported a total of 87 183 days fished and a total national catch of 12 841 t of linefish, excluding tuna and squid (Tables XX and XXI). This represents a drop of 10% from the 1995 linefish catch of 14 103 t.

Catches in KwaZulu-Natal and the coastal region of the former Transkei increased slightly from a figure of 542 t recorded in 1995 to 656 t. In the Western Cape, linefish catches dropped from the record 1995 catch of 13 560 t to 12 185 t. This decrease in overall catches in the Western Cape was probably due to the stabilising of snoek *Thyrsites atun* catches, which reached a level of 9 174 t in 1995. A little over 7 007 t of snoek were caught in 1996, a level consistent with the 1994 catch of 7 303 t.

Catches of other important linefish species continued to decline in the Western Cape. Yellowtail *Seriola lalandi* catches, for instance, dropped to 494 t, from a 1995 level of 769 t. (The 1995 catch was already 10% lower than the previous year's catch.) Hottentot *Pachymetopon blochii* catches remained low, at a level of 274 t. Low hottentot catches are thought to be the result of the infamous "Black Tide" that occurred in the St Helena Bay area in 1994. This resulted in a large mass of low oxygen water drifting south of St Helena Bay and which coincided with substantially higher catches (806 t) of hottentot in the Dassen Island to Cape Point area in 1994. This unusual increase in availability is thought to have had a substantial impact on the resource.

Catches of kob *Argyrosomus inodorus* remained fairly constant, at 658 t, while geelbek *Atractoscion aequidens* catches recovered slightly from a 1995 low of 289 t to 318 t. Geelbek catches remained low when compared to 1993 and 1994 levels of 420 t and 379 t, however.

Red steenbras *Petrus rupestris* catches defied a general upward trend for redfish catches in the Western Cape. While red steenbras catches dropped a further 20% to a level of 39 t, Roman *Chrysoblephus laticeps* and red stumpnose *Chrysoblephus gibbiceps* catches both improved, with the Roman catch of 82 t approaching the 1994 level of 84 t.

Carpenter *Argyrozona argyrozona* catches continued to increase, as a result of increased targeting of this species by the large deck boats on the deep Agulhas Bank. The high prices paid for hand-caught hake prompted the reported hake linefish catch to grow to 1 591 t. This figure represents more than a twofold increase in hand-caught hake catches since 1994. Table XX compares the total

TABLE XIX

Permits issued to licensed South African commercial (A) and semi-commercial (B) linefishing and tuna (T) fishing vessels for the 1994/1995 and 1995/1996* fishing seasons

Registration area**	A	B	T	Total
PNA	0	54	0	54
HB	0	21	0	21
VR	0	118	0	118
ADF	0	212	1	213
PQ	0	237	3	240
SH	0	177	20	197
SBH	1	136	15	152
CT	5	171	43	219
CTA	5	100	93	198
HTB	15	64	65	144
STH	1	13	8	22
ST	6	190	56	252
KB	34	22	30	76
SW	12	130	18	160
C	2	87	3	92
DDF	30	68	6	104
BR	57	74	15	146
SM	1	16	0	17
R	9	92	2	103
MBA	12	33	15	60
G	0	6	1	7
KN	6	22	3	31
H	13	53	22	88
PEA	40	73	55	168
P	15	39	7	61
ELA	6	7	3	16
DNA	6	14	1	21
N	99	23	20	142
Total 1995/96	375	2 252	495	3 122
Total 1994/95	459	2 550	615	3 624

* Boats with linefishing permits may also hold permits for other fishery sectors, e.g. squid-jigging (Table VIII) and purse-seining (Table XVII)

** The codes for registration areas are explained in Table III on p.5

reported Cape catch of linefish species for the 1994, 1995 and 1996 fishing seasons.

Despite changes to provincial boundaries, the National Marine Linefish System continues to record commercial linefish catches from the former Transkei and KwaZulu-Natal coast as a single unit. This is primarily to ensure consistency in data collection for the purpose of long-term comparisons. During 1996 the linefish catch for this region amounted to 656 t (Table XXI). Improved catches of queen mackerel *Scomberomorus plurilineatus*, king mackerel *Scomberomorus commerson* and blueskin *Polysteganus coeruleopunctatus* were made, but catch levels for these species remained low. For instance, the queen mackerel catch of 1.6 t is down 83% from the 1994 catch of 9.4 t. Catches of kobs *Argyrosomus japonicus* and *A.thorpei* remained relatively stable at 62 t while geelbek and yellowtail catches continued to drop.

Landings by fishing harbour are given in Table XXII. Landings at Yzerfontein were greatest, but Lambert's Bay and Kalk Bay were also important landing sites.

Tuna catches reported by South African boats appeared to rise in 1996 (Table XXIII). Catch levels of 5 811 t were recorded, with albacore (longfin tuna) *Thunnus alalunga* constituting 97% of the catch. Limited quantities of yellowfin tuna *Thunnus albacares* (157 t) and bigeye tuna *Thunnus obesus* (19 t) were caught as a bycatch in the pole fishery.

It should be pointed out that adjustments have been made to the catch statistics originally reported by the tuna fishing industry in 1996. This was done at the request of the tuna fishing industry, who were at the time required to submit accurate catch reports to the International Commission for the Conservation of Atlantic Tunas (ICCAT). The catches reported here are approximately 57% higher than those originally submitted for the 1996 tuna fishing season. As a result, it is difficult to draw accurate comparisons between catch records for the preceding years as those too might have been under-reported.

TABLE XX: Total reported Cape catch (to the nearest 100 kg) of linefish species (tuna

Locality	Snoek	Yellow-tail	Kob	Geelbek	Car-penter (silver-fish)
Port Nolloth	449 700	3 700	100	-	-
Doring Bay	3 000	7 300	-	-	-
Lambert's Bay	254 600	2 500	-	-	-
Elands Bay	360 600	100	-	-	-
Laaiplek	68 200	200	-	-	-
St Helena Bay	1 246 000	18 400	-	-	-
Saldanha Bay	241 800	3 300	1 000	-	-
Yzerfontein	2 223 600	37 500	-	-	-
Cape Town	374 700	200	100	-	100
Hout Bay	315 100	600	-	-	-
Kommetjie	456 200	3 300	100	-	-
Kalk Bay	337 500	2 200	27 900	5 600	200
Gordon's Bay	60 100	7 600	57 200	40 500	11 200
Hermanus	258 800	-	3 800	1 300	5 600
Gans Bay	262 100	44 800	16 400	69 000	56 400
Struis Bay	17 200	225 500	29 900	62 000	172 000
Arniston	32 800	117 000	32 300	40 400	384 000
Still Bay	500	-	207 400	3 800	6 900
Mossel Bay	100	-	60 300	900	8 900
Plettenberg Bay	40 900	1 400	9 300	13 400	26 800
Jeffreys Bay	-	1 800	14 600	1 600	31 300
Port Elizabeth	4 300	11 900	67 100	24 200	93 700
Port Alfred	-	1 800	120 700	14 000	59 100
East London	-	2 600	10 000	41 200	21 700
Total (1996)	7 007 800	493 700	658 200	317 900	877 900
Total (1995)	9 174 400	768 700	645 900	289 400	746 800
Total (1994)	7 303 500	823 800	626 200	379 100	613 900

* Mainly baardman, blue hottentot, butterfish, flathead, fransmadam, gurnard, jac

TABLE XXI: Total reported catch (to the nearest 100 kg) of linefish species by registe

Locality 1995 (updated)	Kobs*	Geelbek	Slinger	Santer	Blueskin	English-man
Former Transkei	1 600	300	6 300	1 000	-	2 300
Southern KZN	24 200	78 900	82 200	19 600	11 400	21 300
Northern KZN	31 800	17 300	68 700	25 700	4 600	2 900
Total	57 600	96 500	162 200	46 300	16 000	26 500

Locality 1996 (updated)	Kobs*	Geelbek	Slinger	Santer	Blueskin	English-man
Former Transkei	778	1 824	17 427	1 413	2 110	4 613
Southern KZN	28 234	49 062	67 686	16 402	9 063	22 731
Northern KZN	32 838	15 128	92 424	35 653	16 794	3 506
Total	61 850	66 014	177 537	53 468	27 967	30 850

* Includes kob and squaretail kob ** Includes dageraad, Dane, king s
\# Mainly seacatfish (barbel), German, grunter, kingfish, rubberlip, carpenter (silv

registered commercial boats in 1994, 1995 and 1996

ed een-ras	Red stump-nose	Dageraad	Seventy-four	Santer	Hottentot	Chub mack-erel	Sharks	Panga	White stump-nose	Elf	Hake	Others†	Total
-	-	-	-	-	400	-	400	-	-	-	-	-	454 300
-	-	-	-	-	2 500	-	-	-	-	-	-	-	12 800
-	-	-	-	-	28 200	-	-	-	-	-	-	-	285 300
-	-	-	-	-	9 500	-	-	-	-	-	-	7 500	377 700
-	-	-	-	-	1 200	-	200	-	-	-	-	100	69 900
-	-	-	-	-	12 300	-	-	-	-	-	-	-	1 276 700
-	-	-	-	-	28 200	-	7 100	-	131 600	700	-	9 100	422 800
-	-	-	-	-	58 200	-	700	-	-	-	-	1 400	2 321 400
-	-	-	-	-	40 800	-	1 700	200	-	-	-	1 600	419 400
-	-	-	-	-	5 200	-	400	-	-	-	-	400	321 700
-	-	-	-	-	26 600	100	2 000	600	-	100	200	1 100	490 800
-	100	-	-	100	12 100	100	4 300	9 100	45 400	7 300	100	6 500	461 500
-	600	-	-	100	13 600	100	4 700	4 200	39 600	16 900	100	13 400	279 900
-	100	-	-	-	3 900	200	10 800	700	-	-	-	500	287 200
500	2 600	-	-	-	30 900	36 700	58 100	600	2 900	300	500	11 800	610 600
5 100	2 600	-	-	1 200	300	6 200	22 500	200	-	4 600	2 600	300	564 800
6 500	1 900	100	-	7 400	100	2 300	29 900	-	-	300	7 500	500	678 600
100	300	100	-	3 500	-	1 800	48 100	100	300	400	142 600	1 200	422 300
300	500	100	-	3 600	-	13 100	32 300	300	100	200	156 900	2 100	285 600
700	200	100	-	500	-	15 400	500	2 400	-	-	990 300	10 500	1 114 000
600	600	500	-	700	-	7 600	200	8 900	-	-	108 000	300	180 000
1 200	2 800	9 800	-	16 800	-	2 700	500	19 100	-	3 300	154 700	2 800	425 900
1 400	5 900	6 700	100	5 100	-	1 200	1 200	52 300	-	600	26 200	6 000	306 300
2 900	500	3 700	2 100	700	-	400	-	9 900	-	100	1 000	8 100	115 200
9 300	18 700	21 100	2 200	39 700	274 000	87 900	225 600	108 600	219 900	34 800	1 590 700	85 200	12 184 700
9 100	14 500	16 900	2 300	33 000	248 300	94 400	298 100	98 000	125 300	43 000	756 300	89 200	13 560 600
4 100	19 700	23 100		36 400	805 500	102 300	499 300	155 900	110 600	33 400	449 200	112 200	12 231 700

lip, knifejaw, maasbanker, rock-cod, seacatfish (barbel), steentjie and wreckfish

l boats fishing in the former Transkei and KwaZulu-Natal in 1995 and 1996

	Scots-man	Emperor	Seventy-four	Red steenbras	Unspecific redfish**	King mackerel	Queen mackerel	Yellowtail	Poenskop (Black musselcracker)	Rock-cods	Others#	Total
	1 100	-	100	500	1 800	-	-	1 000	800	4 500	4 500	25 800
	8 000	3 600	1 100	200	500	2 000	200	7 000	2 300	16 900	44 300	328 700
	100	200	100	-	500	2 100	100	100	700	24 800	8 300	188 000
	9 200	3 800	1 300	700	2 800	4 100	300	8 100	3 800	46 200	57 100	542 500

	Scots-man	Emperor	Seventy-four	Red steenbras	Unspecific redfish**	King mackere.	Queen mackerel	Yellowtail	Poenskop (Black musselcracker)	Rock-cods	Others#	Total
	4 658	1 098	592	2 627	4 134	49	-	847	2 666	7 564	11 295	63 695
	8 037	2 321	1 834	982	2 550	22 794	210	1 763	3 826	18 510	67 290	323 295
	141	325	429	2	794	13 094	1 419	89	2 119	32 898	21 100	268 753
	12 836	3 744	2 855	3 611	7 478	35 937	1 629	2 699	8 611	58 972	99 685	655 743

ottentot, dolphinfish, yellowfin tuna and unspecified fish species

TABLE XXII: Total reported Cape landings (to nearest 100 kg) of linefish species at fishing harbours in 1995 and 1996 (excluding tuna)

Locality	Snoek	Yellowtail	Kob	Geelbek	Carpenter (silverfish)	Roman, Red stumpnose, Santer	Red steenbras, Dageraad, Seventy-four	Hottentot	Chub mackerel	Sharks
Port Nolloth	12 310	-	-	-	-	-	-	-	-	-
Doring Bay	4 859	-	-	-	-	-	-	3 925	-	-
Lambert's Bay	595 174	49	-	-	-	-	-	33 580	-	-
Elands Bay	66 455	370	-	-	-	-	-	5 607	-	-
Laaiplek	376	-	-	-	-	-	-	-	-	-
St Helena Bay	-	-	-	-	-	-	-	-	-	-
Saldanha Bay	249 506	-	42	19	-	-	-	610	-	25
Yzerfontein	4 386 670	20 805	-	-	-	-	-	39 564	-	-
Table Bay Harbour	-	-	-	-	-	-	-	-	-	-
Hout Bay	151 164	-	-	-	47 500	-	-	1 900	-	-
Kommetjie	38 837	-	-	-	-	19	-	4 615	-	-
Witsands (Kommetjie)	13 524	-	-	-	-	28	-	6 533	-	-
Buffels Bay	48	-	-	-	-	-	-	799	-	-
Kalk Bay	461 692	940	12 302	948	350	3 126	-	10 132	-	50
Gordon's Bay	18 015	2 700	10 970	8 457	2 778	3 756	20	4 019	-	-
Hawston	-	-	-	-	-	-	-	-	-	-
Hermanus (New Harbour)	-	-	-	-	3 002	-	-	-	-	-
Hermanus	-	450	-	8	63 100	12	45	59	-	48
Gans Bay	17 170	-	-	2 570	210	-	-	30	-	-
Waenhuiskrans (Arniston)	-	86 172	36 683	47 003	9 172	-	-	-	-	32 419
Still Bay	-	47	175 413	4 102	4 748	7 031	80	-	514	40 029
Total	6 017 920	111 533	235 410	63 117	130 860	13 972	145	111 373	514	72 571
Total (1995)	5 163 300	144 600	200 200	56 100	135 800	27 700	13 700	81 000	6 300	8 300

* Mainly baardman, blue hottentot, butterfish, flathead, fransmadam, gurnard, jacopever, kingklip, knifejaw, maasbanker, rock-cod, seacatfish (barbel), steentjie and w

TABLE XXIII

Commercial catches (t) of tuna species reported per catch method by South African vessels in 1996

Method	Albacore		Yellowfin		Bigeye		Skipjack		Bluefin		Total	
	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996
Pole	4 127	5 425	145	139	27	19	2	1	0	0	4 301	5 584
Longline	-	-	-	-	-	-	-	-	-	-	0	0
Purse-seine	-	-	-	-	-	-	-	-	-	-	0	0
Rod & reel	8	209	-	18	-	-	-	-	-	-	57	227
Trawl	-	-	-	-	-	-	-	-	-	-	0	0
Grand total	4 135	5 634	145	157	27	19	2	1	0	0	4 358	5 811

Panga	White stumpnose	Elf	Hake	Other	Total
-	-	-	-	-	12 310
-	-	-	-	-	8 784
-	-	-	-	474	629 277
-	-	-	-	7 101	79 533
-	-	-	-	-	376
-	-	-	-	-	0
-	7 757	-	-	162	258 121
-	-	-	-	-	4 447 039
-	-	-	-	-	0
-	-	-	181 945	9 385	391 894
-	-	-	-	402	43 873
-	-	-	-	791	20 876
-	-	-	-	-	847
3 627	17 148	6 841	55	7 937	525 148
2 376	4 167	2 735	-	1 837	61 830
-	-	-	-	-	0
-	-	-	-	-	3 002
-	-	-	-	-	63 722
-	-	-	-	-	19 980
-	-	-	4 423	1 394	217 266
-	108	33	116 477	457	349 039
6 003	29 180	9 609	302 900	29 940	7 135 047
7 500	9 900	8 700	32 200	28 700	5 924 000

3.13 Mullet and St Joseph

In comparison with 1995 the number of permit-holders in this fishery decreased by 3,7% and the number of nets was reduced by 3,3%. During 1996 there were four more nets than there were in 1995. The vast majority of nets continued to be used on the West Coast, between Elands Bay and Langebaan (Table XXIV).

The total reported mullet *Liza richardsoni* catch decreased to a level of 1 086 t, a figure 9,1% lower than the 1995 catch. Bycatch figures are also reportedly 12% lower than 1995 catches (Table XXV). The number of St Joseph sharks *Callorhinchus capensis* landed in 1996 decreased by 25%, but catches of this species were significantly higher than in 1994 when the black tide severely affected catches in the St Helena Bay and Elands Bay areas.

It should be pointed out that recent research has shown that, although permit-holders are compelled to submit details of their catches to fisheries authorities, in many cases catches, and specifically bycatches, are under-reported. As a result, it is likely that this important component of the South African linefish catch is not accurately recorded here and total catch could be in the region of 6 000 – 8 000 t. Furthermore, it has been established that some fishers are involved in targeting prohibited species, particularly galjoen *Dichistius capensis*, for which a large but illicit fishery exists. The future management of the net fishery depends to a large degree on improved monitoring and control.

TABLE XXIV

Geographical distribution of beach-operated net permits, permit-holders and mullet catches for 1995 and 1996

Region		Number of permit-holders		Registered drift and beach-seine nets		Number of mullet caught		Percentage of beach-seine catch	
		1995	1996	1995	1996	1995	1996	1995	1996
3-6	Orange River to Lambert's Bay	86	62	97	65	411 723	206 784	8.5	4.7
7-12	Elands Bay to Langebaan	304 (6)*	308	755 (6)	756	2 824 562	1 251 604	58.5	28.8
13-17	Yzerfontein to Kommetjie	34	34	35	35	270 329	803 996	5.6	18.5
18-23	Simonstown to Kleinmond	12	15	23	23	783 825	624 976	16.2	14.5
24-27	Kleinmond to Cape Agulhas	33	33	42	42	399 166	1 018 828	8.3	23.4
28-32	Cape Agulhas to Still Bay	25	24	28	27	112 571	315 076	2.3	7.3
33-35	Mossel Bay to Port Elizabeth	2 (1)	2	2 (1)	2	26 314	122 744	0,6	2.8
Total (numbers)		496 (7)	478	982 (11)	950	4 828 490	4 344 008	100	100
Total (kg mass)						1 207 122	1 086 002		

* The number of "ration-fish" permits issued are shown in parenthesis. These permits continue to be issued although their number is not reflected in the data for 1996

TABLE XXV

Species other than mullet caught in drift, beach-seine and shark gillnets in 1995 and 1996

Species	Catch (kg)	
	1995	1996
Baardman	-	655
Barbel	-	1 653
Elf	3 173	5 433
Galjoen	-	345
Geelbek	-	35
Yellowtail	10 622	12 260
Blacktail	-	233
Hottentot	-	348
Kob	1 939	3 714
Leerfish	-	4
Chub mackerel	10 060	-
Horse mackerel (maasbanker)	5 709	18 405
Musselcracker	-	45
Sand steenbras	-	0
White steenbras	13 643	6 968
Springer	-	80
Steentjie	-	8
St Joseph	102 519	76 240
Stumpnose	-	310
Streepie	-	4 068
Soupfin shark	543	10
Grunter (Atlantic spotted)	-	129
Gurnard	-	2 218
Pilchard	4 304	1 751
Snoek	-	2 097
Sole	-	1
Squid	-	10
Hake	-	505
Zebra	-	0
Spiny dogshark	-	9
Rays	3 765	10 200
Unspecified sharks	9 131	1 386
Unspecified fish	4 545	43
Total	169 953	149 163

3.14 Demersal fish

In 1996 the demersal fishery was directed at three main species: the Cape hakes *Merluccius capensis and M.paradoxus*, Agulhas sole *Austroglossus pectoralis* and horse mackerel *Trachurus trachurus capensis*, with a large bycatch of associated species. The largest sector of the demersal fishery is the deep-sea trawling sector, which is based in Cape Town and Saldanha Bay. The much smaller inshore fishery is centred in Mossel Bay on the Cape south coast, while the midwater fishery is based in Cape Town. In 1996 catches remained stable and showed slight increases across all three sectors (Table XXVII).

The hake-directed fishery is South Africa's largest and most valuable. In 1996 the fishery was issued with a total TAC of 151 000 t. The deep-sea sector was issued with the bulk of this allowable catch, receiving 141 166 t or 93%, while the inshore fishery received 9 834 t (6,5%). Of the total hake TAC, an amount of 2 300 t was issued to the hake longline experiment, the Minister held 2 700 t in reserve and a further allocation of 1 000 t was made to Moçambique, in terms of a bilateral fisheries agreement.

The Agulhas sole TAC remained at 872 t and a precautionary catch limit of 58 000 t was set for horse mackerel.

The total nominal catch of hake in the 1996 calendar year was 153 686 t, which is 2 686 t above the TAC awarded for 1996. This overcatch was mainly due to a carry-over of quota from the 1995 hake allocation. (Industrial instability during 1995 disrupted fishing activity and resulted in a shortfall in hake catches.) Increased landings of line-caught hake also contributed to the overcatch. At present line-caught hake is not accounted for within the ambit of the annual TAC. As catches in this sector are increasing, it is anticipated that greater control will have to be exerted in the future. The results of the hake longline experiment, in its third year during 1996, will contribute to this process.

The KwaZulu-Natal trawl catch remains a relatively small proportion of the total demersal catch. Catches in this sector dropped to 330 t in 1996 from a 1995 level of 512 t. Although prawns (Tugela and pink prawn) are the target species of this fishery, they comprise a small proportion of the total catch (Table XV on p. 14).

TABLE XXVI

Nominal (live) mass of bottom- and midwater-trawled fish, cephalopods and crustaceans landed in South Africa in 1995 and 1996, showing the amounts taken on the West and South coasts

Species	1995		1996			
			West Coast	South Coast	Total	
	tons	%	tons	tons	tons	%
Cape hakes	145 522	77.7	88 893	64 793	153 686	78.48
Kingklip	2 860	1.56	984	2 145	3 130	1.60
Soles	770	0.42	16	909	925	0.47
Kob (Kabeljou)	126	0,07	-	154	154	0.08
Panga	647	0.35	7	617	624	0.32
Other reds	65	0.04	2	6	8	0.00
Carpenter (Silverfish)	23	0.01	-	15	15	0.01
Pomfret (Angelfish)	1 740	0.95	972	95	1 067	0.54
Gurnards	515	0.28	119	322	441	0.23
Jacopevers	1 109	0.61	762	421	1 183	0.60
John Dory	1 069	0.58	681	475	1 156	0.59
Horse mackerel (Maasbanker)	9 321	5.09	3 418	9 515	12 933	6.60
Skates	940	0.51	9	1 007	1 016	0.52
White stumpnose	51	0.03	1	17	18	0.01
Snoek	6 923	3.78	3 045	2 429	5 474	2.80
Monk	5 941	3.24	4 720	1 419	6 139	3.14
Sharks and St Joseph	344	0.19	25	375	400	0.20
Chub mackerel	1 918	1.05	464	2 529	2 993	1.53
Ribbonfish	4 957	2.7	1 025	2 172	3 197	1.63
Southern rover (bonnetmouth, red mullet)	102	0.06	141	75	216	0.11
Red squid	19	0.01	18	15	33	0.02
White squid	339	0.18	15	369	384	0.20
Octopus	34	0.02	19	27	46	0.02
Other	310	0.17	295	284	579	0.30
Subtotal	**180 122***	**100**	**105 631**	**90 186**	**195 817**	**100.00**
West coast sole & gurnard	-	-	-	-	135	-
Hake longline & handline	-	-	-	-	5 460	-
Total (1996)	-	-	-	-	**201 412**	-
Natal: Crustaceans	400	-	-	-	246	-
Cephalopods	43	-	-	-	22	-
Finfish	70	-			62	-
Grand Total	**180 635***	-	-	-	**201 742**	-

* Figure excludes 2 483 t offal or trash fish

3.14.1 Deep-sea trawl

The deep-sea sector landed 170 722 t or 87.2% of the total demersal catch in 1996. This is higher than the same sector's catch of 159 318 t, made in 1995. (Table XVII).

Hake-directed bottom trawling remained the main objective of the fishery. The deep-sea sector landed a total of 140 624 t of hake, 10% more than the 1995 catch of 126 704 t.

Hake-directed catch rates were also higher. The preliminary 1996 *cpue* estimates for both the West and South Coast fishing grounds showed that the *cpue* recorded in 1996 was 0.84 t/h, as opposed to 0.65 t/h for the 1995 season. In addition, the May 1996 South Coast survey biomass estimates were at a level last seen in 1990. Enhanced catch rates were also observed in the early '90s during the last *El Niño* – Southern Oscillation (ENSO) event. It was apparent from indices such as the Southern Oscillation Index that another ENSO event developed during 1996.

Regulations governing the fishery remained unchanged; deep-sea vessels are restricted to a net of 110mm stretched mesh on the West Coast, but are permitted nets of 75mm mesh east of 20°E.

The structure of the deep-sea fishing industry remained relatively stable, with the bulk (78%) of the 1996 hake TAC being caught by six companies. Calls to broaden participation in the deep-sea sector resulted in 3% of the hake TAC being allocated to new entrants. In all, 13 new fishing companies received a combined hake quota of 4 463 t. No allocation was made to community trusts.

Bycatch remained an important component of the deep-sea catch (Table XXVII). Kingklip *Genypterus capensis* catches remained low at under 3 000 t.

As in previous years, monkfish *Lophius vomerinus*, snoek, horse mackerel and ribbonfish *Lepidopus caudatus* constituted a large proportion of the bycatch in the deep-sea sector, accounting for 12% of the total catch and 69% of bycatch. Monkfish catches remained stable at 6 019 t while snoek catches decreased from 6 871 t to 4 634 t in 1996. Horse mackerel catches rose to a level of 7 259 t.

3.14.2 Inshore trawl

The south-east coast inshore trawl fishery operates between Cape Hangklip in the west and Port Alfred in the east. Mossel Bay is the centre of the fishery but Hermanus, Gans Bay and Port Elizabeth are all important landing sites. In the interests of fishing effort control the inshore industry has a self-imposed maximum vessel power limit of 750 bhp (552Kw). During 1996, 33 trawlers were active in this fishery. Most (64%) were between 20m and 30m long. Smaller vessels (36% of the fleet) targeted sole on the shallower fishing grounds while the larger vessels targeted hake farther offshore.

The inshore fishery remained stable and 1996 catches (16 407 t) were only slightly higher than 1995 catches (15 238 t). Hake, sole and horse mackerel are the three target species in the fishery and together these species accounted for 82% of the total 1996 inshore trawl catch. Hake catches in 1996 were 11 044 t, slightly higher than the 1995 catch of 10 602 t. Sole catches increased in 1996 from 769 t (1995) to 913 t. Horse mackerel catches were also higher at 1 461 t (1 012 t were landed in 1995).

The annual catch rate for sole in 1996 was high (20,1 $kg.h^{-1}$), on par with that of 1995 (20,8 $kg.h^{-1}$). However, the half-yearly catch rate in 1996 was lower than in 1995, which had been the highest level recorded for the past 10 years. The sole resource is regarded as stable and an annual TAC of 872 t has remained in place since 1991.

The inshore hake allocation for 1996 was 9 834 t, all of which was caught. Additional amounts of quota were imported from the deep-sea sector, making up a total inshore hake catch of 11 044 t. This is considerably higher than the average annual catch and may be attributed to increased availability of hake closer inshore.

A total of 6 434 t of horse mackerel was kept in reserve for the inshore fishery, but only 1 461 t was caught by this sector in 1996. The inshore horse mackerel catch averaged 2 600 t between 1984 and 1995, so the 1996 catch is well below average. Given the fact that hake and sole availability were high in 1996, it is likely that low horse mackerel catches were the result of a lack of interest in the resource, rather than because of poor availability.

As for other sectors of the demersal fishery, bycatch is an important component of the inshore sector. Bycatch on the South Coast is characterized by a high diversity of species. At just under 1 000 t, skate catches accounted for the highest proportion of bycatch. Significant catches of panga *Pterogymnus laniarius*, sharks and St Joseph sharks were also made (Table XXVII).

3.14.3 Midwater trawl

In all, 17 permits were issued for horse-mackerel-directed midwater trawling on the South Coast in 1996. A total catch of 4 212 t was landed using this gear. This represents an increase in catch from the 1995 midwater horse mackerel trawl of 2 621 t. The midwater fleet accounted for one-third of the total South African horse mackerel catch in 1996.

The total horse mackerel trawl catch for 1996 was 12 933 t, of which 9 515 t was landed on the South Coast. The horse mackerel bycatch in the West Coast hake fishery remained low in 1996, but at 3 418 t it was bigger than those of the previous two years. The purse-seine catch of horse mackerel in 1996 (18 988 t) was substantially higher than in the previous seven years (Table XVI on p. 15).

3.14.4 West Coast sole and gurnard

Two permits were issued for catching West Coast sole in 1996. A total of 16 t of West Coast sole was landed by the permit-holders.

Only three permits were issued to boats targeting gurnard *Chelidonichthys capensis* close to St Helena Bay, as opposed to four permits issued in 1995. Licensed vessels reported a total catch of 20 t and the balance of the 119 t gurnard catch was reported by the remainder of the demersal fishing fleet.

3.14.5 Hake-directed longline experiment

Catches of line-caught hake have been increasing steadily since 1990. This phenomenon can be attributed to several factors, including an increase in localised abundance of hake inshore on the South Coast, an increase in the export value of line-caught hake and a decline in the abundance of traditionally caught linefish, e.g. redfish and kob. Traditionally, line-caught catches of hake have not been of major concern as catches were generally limited, but the fishery is shifting to one which is actively targeting hake.

In July 1993 the Sea Fisheries Advisory Committee recommended that experimental hake-directed longline research be started and in May 1994 a comprehensive research programme to test the feasibility of hake-directed longlining in South Africa began. The process that followed was one of extensive consultation relating to the evolving political climate at the time. Broad participation in the process, conducted under the auspices of independent facilitators, led to agreement on a firm scientifically based strategy. The strategy accepted was that the experiment would follow the precautionary approach over a period of five years and, to facilitate this process, three distinct phases would be followed; namely, a one-year pilot study, followed by a two-year experimental fishery and a further two years of closely regulated and controlled fishing to monitor the possible long-term biological effects of longlining on the hake stocks.

The first phase (pilot study) was successfully completed between May 1994 and May 1995 and the second phase (experimental fishery) was started in December 1995, with the first full effective year completed in 1996. An allowable catch of 4 300 t of hake was allocated to the longline experiment in 1996. The deep-sea and tuna sectors each received 1 200 t while the inshore sector was allocated 800 t and 300 t was allocated specifically to the Eastern Cape. A further 2 000 t of "own quota" was used for the experiment by the deepsea sector.

The experimental phase was to be completed by the end of 1997.

TABLE XXVII

Nominal (live) mass of demersal fish landed (t) by different trawling sectors in South Africa in 1995 and 1996

Species	Deep-sea trawl	Inshore (South Coast)	Midwater trawl	Total
Hakes	140 624	11 044	2 018	153 686
Kingklip	2 750	159	220	3 129
Soles	1	913	-	914
Kob (Kabeljou)	-	152	-	152
Panga	81	529	13	623
Other reds	5	3	-	8
Carpenter (Silverfish)	1	14	-	15
Pomfret (Angelfish)	1 060	-	7	1 067
Gurnards	196	238	6	440
Jacopever	1 153	9	22	1 184
John Dory	1 015	4	137	1 156
Horse mackerel (Maasbanker)	7 259	1 461	4 212	12 932
Skates	8	995	-	1 003
White stumpnose	1	16	-	17
Snoek	4 634	41	798	5 473
Monkfish	6 019	47	73	6 139
Sharks and St Joseph	23	374	-	395
Chub mackerel	2 229	24	740	2 993
Buttersnoek (ribbonfish)	2 838	5	353	3 196
Southern rover (bonnetmouth, red mullet)	157	1	59	217
Red squid	34	-	-	34
White squid	118	248	18	384
Octopus	43	3	-	46
Others	473	127	12	612
Subtotal	**170 722**	**16 407**	**8 688**	**195 817**
West Coast sole & gurnard	-	-	-	135
Longline & handline	-	-	-	5 460
Total (1996)	**-**	**-**	**-**	**201 412**
Subtotal (1995)*	**159 318**	**15 238**	**3 228**	**177 784**
West Coast sole & gurnard	-	-	-	502
Longline & handline (1995)	-	-	-	2 484
Total (1995)	**-**	**-**	**-**	**180 770**

* Excludes 2 483 t offal (trash fish)

A Patagonian toothfish is hauled aboard a longline vessel

3.14.6 Demersal species and stocks

The Cape hakes form the basis of the southern African bottom-trawl fishery. The deep-sea sector targets the deep-water Cape hake *Merluccius paradoxus*, a species whose distribution extends offshore to depths of at least 800m. The shallow-water hake species, *Merluccius capensis*, constitutes only 10% of the deep-sea sector's catch. This species of hake lives in inshore waters up to about 380m water depth and is caught predominantly by inshore trawlers and, increasingly, by fishers using hooks and line.

During 1996 most fishing effort was directed at the well-established trawling grounds on the West Coast and the Agulhas Bank. The deep-sea species dominates catches on the West Coast, but the shallow-water species is the dominant catch over the Agulhas Bank. There is increasing concern for shallow-water stocks that are being targeted by the growing hake-directed handline fishery. Catches of line-caught hake are escalating and, at present, these catches are not accounted for within the ambit of the hake TAC.

The Agulhas sole is a small but commercially important component of the mixed-species inshore fishery on the South Coast. The resource has been exploited since the beginning of the century and was one of the first stocks to be managed in South Africa.

Today, several measures are in place to manage Agulhas sole. An annual TAC is still set and has remained at 872 t since 1991. There are some concerns about the high proportion of juvenile sole caught and, as a result, certain areas were closed to fishing in 1996. There are, however, no indications that exploitation is having a detrimental impact on the resource and good catches were made in 1996.

Monk catches have shown an increase of 18% since the 1994 fishing season owing to increased targeting of this high value species.

Orange roughy *Hoplostethus atlanticus* is the most sought-after species in a complex of deepwater fish which occur worldwide. They form dense, localised aggregations and are thought to be extremely long lived; two features that make them susceptible to over-exploitation. Exploratory fishing for orange roughy off South Africa started in 1995 but has shown poor results to date. Effort has therefore been directed at oreo dories, particularly warty oreo dory *Allocyttus verrucosus*. In 1996, two permit-holders each entered into collaborative ventures with other established fishing companies in an attempt to defray costs; four companies were directly involved in the exploratory deep-sea venture. No big catches of either oreo dory or

orange roughy were made, but consistent traces of orange roughy were made from a natural feature, designated the Cape Canyon, and small catches of oreo dory were made from another region, referred to as the Dory Patch.

The lack of reliable age-structured catch and *cpue* data series have hampered attempts at producing reliable stock assessments for the horse mackerel resource. Research is currently aimed at understanding the behaviour of this species which is thought to undertake nocturnal migrations through the water column. The low demersal and midwater catches that were made in 1996 were mainly attributable to the low economic value of the species.

3.15 Patagonian toothfish

The Patagonian toothfish *Dissostichus eleginoides* is a deep-sea species found throughout large areas of the sub-Antarctic oceans, but primarily in southern parts of the Atlantic and Indian oceans. The fish is also known as Chilean sea bass and black hake.

The Patagonian toothfish is a deep-sea species which is fished with longlines at depths of about 1 500m. Even though toothfish populations are spread over a relatively large area, the fishing grounds are concentrated around the islands in the region. This is important for South Africa because the country has jurisdiction over the Prince Edward Islands and the waters that surround the islands form part of South Africa's Exclusive Economic Zone (EEZ).

In 1996, for the first time, five experimental permits were allocated to South African vessels to fish for Patagonian toothfish around the Prince Edward Islands. A TAC of 1 200 t was split equally between the five operators and a nominal catch of 1 663 t was recorded. The apparent over-catch can be explained by an over-generous conversion factor from whole to gutted fish.

It is well known that foreign fleets, and some South African-flagged vessels, have been catching Patagonian toothfish illegally around the Prince Edward Islands, as well as in other regions of the Southern Ocean. There are already signs that the resources in the area are being depleted.

3.16 Seals

The moratorium on seal harvesting imposed by the Minister of Environment Affairs in July 1990 remains in place. As a result, no seal products were exported from South Africa in 1996.

3.17 Guano

No seabird guano was harvested or shipped from South Africa during 1996.